Now when leaves fall

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DESCRIPTION OF INVENTION
FOR THE PATENT

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(54) COMPOSITION FOR WHITEWASHING FRUIT TREES
(57) Abstract of invention: Apparatus, which is equipped with a mixer, is charged with water, butadiene-styrene or butadiene-nitrile latex (7-25 mass %) and thickener (0.5-3 mass %) and is stirred for 0.5-1 hr. If thickener requires preliminary swelling, then before mixing it is held at 20 +- 5 ^{0}C for 1.5-2 hrs., followed by agitation for 30 min. Subsequently, 2-10 mass % urea-formaldehyde resin is added to the working mixture, and mixing is continued for 20 min. Subsequently add 20-60 mass % carbide mud and mix 20-30 min. until a uniform mass is obtained. Sodium salt of carboxymethylcellulose or 7 % solution of polyacrylamide are used as thickeners. The composition possesses improved protective properties due to the increase of biological stability toward solar damage and cold, which is derived from development of conditions conducive to the formation of anthocyans in the fibers of the bark (rows(?) 1-3, table 2).

The present invention concerns agricultural industry, in the field of whitewash compositions for protection of fruit trees from sun damage and from damaging effects of low temperatures. It may be used in industrial, collective and personal gardening.

Chalky compositions containing clay, mullein, skim milk, soybean milk, casein and carpentry glue as binders are widely used for whitewashing of trees with the purpose of protecting them from solar radiation. However, the above named whitener compositions

are unstable and wash away rapidly with precipitation in the form of rain and wet snow.

A whitewash composition was fundamentally improved by introducing into the aqueous suspension of the powder a polyvinylacetate binder.

Water insoluble whitewash of this composition polymerizes and forms on the surface of the bark during drying coatings which wash away with difficulty in precipitation.

However, the given composition is not resistant to freezing, coagulates at temperatures below $0^{0}C$ and loses its useful properties.

A whitewash composition for the protection of fruit trees from solar radiation is known, which is based on a latex containing white pigment (titanium dioxide, mixture of barium sulfate and zinc sulfide, known as lithophone), filler (chalk, silicates) and repellent (acid sulfate ? ? of methylthyuram? - TMTD).

The given composition shows uniform coverage on the surface of the bark of fruit trees and high reflective properties.

Solar damage of fruit trees occurs during clear cold weather in the middle and toward the end of winter. But these whitewash compositions can be applied only at non-freezing temperatures. Therefore, the trees are coated with the whitewash in the fall, from the beginning of november until the onset of steady freezing. The growth during the autumn period develops biological self defense from winter solar damage, which manifests itself with the acquisition of violet-reddish coloration of the bark due to the

formation of anthocyans. The process of the formation of anthocyans proceeds actively in the bark of the trees with good access of light to the skeletal organs; it starts in november and continues to the onset of steady freezing. Insofar as biological self protection of trees from solar damage is inadequate, supplementary protection with whitewash is employed. The greatest effect in the process of protection of fruit trees from solar damage is obtained in such instances where the whitewash does not obstruct the formation of anthocyans during the autumnal period.

The above examined analogs of whitewash compositions have a deficiency that a coating with high reflectance properties (80%) develops on the bark of fruit trees immediately after application. Such reflectance property of the whitewash coating is needed in the middle and toward the end of winter. However, in the autumnal period high reflectance properties retard the formation of entocins(?) appearing right after the application of the coating with high reflectance properties and low light transmission; this constitutes a great deficiency of whitewash compositions.

The closest to the claimed composition in its technical content appears to be the whitewash composition containing mass %:

Water dispersible binder (copolymer dispersion of vinyl acetate with dibutylmaleate)	45-50
Fillers - chalk	20-25
talc	5-7
Pigment (titanium dioxide)	7-10
Coalescing additive (mixture of pentadiol and triol)	2-2.5
Repellent and fungicide (TMTD)	2.5-4
Thickener (sodium salt of carboxymethylcellulose)	0.6-0.8
Stabilizer (sodium hexametaphosphate)	0.6-0.8
Water	20-30

The given composition represents a coating, which is difficult to wash away, and which has high reflective properties right after the application of the coating; this appears to be a shortcoming, mentioned above.

The object of the invention appears to be improvement of its protective properties as a result of an increase of biological stability toward solar damage and freezing through the creation of conditions for the formation of anthocyans in the fiber of the bark.

The proposed goal is achieved by adding carbide mud and urea-formaldehyde resin to the latex-containing composition with the following relationship of components based on dry mass %:

Latex	7-25
Urea-formaldehyde resin	2-10
Carbide mud	20-60
Thickener	0.5-3.0
Water	Remainder

The composition based on latex, carbide mud and urea-formaldehyde resin provides a coating with a high light transmission (60%), which corresponds to the reflectance of 40%. Light transmission of such a coating decreases gradually due to rain action. Correspondingly, reflectivity increases, which provides favorable conditions for the development biological self protection of the bark fiber from solar radiation during the middle and end of the winter.

The proposed composition for the protection of trees is technically more refined in that it contains a small number of components, of which the one used in greatest amount is carbide

mud, a high tonnage industrial waste.

The composition is prepared by the following method.

Latex and thickener are charged to an apparatus, which is equipped with a mixer, and the charge is mixed for 0.5-1 hr. If the thickener requires preliminary swelling, it should be held at 20+-5^{0}C for 1.5-2 hrs. Subsequently, the agitator is turned on, and agitation is continued for 30 min. Then urea-formaldehyde resin is added under agitation to the mixture, and mixing is continued for 20 min. Subsequently, carbide mud is charged taking into account its moisture content, and agitation is continued for 20-30 min until a uniform mass is obtained.

The finished composition is poured into containers.

Examples of the formulations of the composition according to the invention, control examples, prototypes and results of the investigations are presented in tables 1 and 2. One can see in the tables that the proposed composition for the protection of fruit trees is equivalent in physico-mechanical properties to the prototype, but exceeds them significantly in the content of anthocyans in the bark of the trees, which secures higher stability of trees covered with the claimed composition toward solar damage and toward freezing.

Claims of invention.

1. A composition for whitewashing fruit trees, containing latex as a binder, thickener, filler and water, characterized so that conditions are created for the formation of anthocyans in the fiber of the bark for the purpose of improving its protective

properties by increasing the biological stability toward solar damage and freezing, that latex binder contains butadiene-styrene or butadiene-nitrile latex, that the filler is carbide mud, as well as urea formaldehyde resin, with the following relative amounts of components, mass %:

Butadiene-styrene or butadiene-nitrile latex	7-25
Thickener	0.5-3.0
Carbide mud	20-60
Urea-formaldehyde resin	2-10
Water	Remainder

2. Composition according to 1, characterized so that as a thickener it contains a sodium salt of carboxymethylcellulose or a 7% solution of polyacrylamide.

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